

MACHINE TRANSLATION of JP09206382

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] In this invention, it is related with the medical-application guidewire used in order to make insertion of the catheter safely reliable when introducing a catheter in a cardiovascular.

Therefore, it is related with the joining structure of the medical-application guidewire in the case of connecting the guidewire for extension with series shape at the medical-application guidewire in detail.

[0002]

[Description of the Prior Art] A medical-application guidewire (only henceforth a guidewire), In order to make the insertion safely reliable when inserting the catheter of a super-thin flexible pipe object into a blood vessel for the purpose of the therapy of angiography or a vasoconstriction part, The guidewire which consists of a flexible super-thin wire rod shown in JP,4-25024,B etc. is used, a catheter is inserted into a blood vessel along with the guidewire beforehand inserted into the blood vessel, the guidewire is exchanged and the appropriate back performs the therapy by a catheter.

[0003] And the balloon catheter used for the therapy of a vasoconstriction part, preparing several things from which the diameter of huge of a balloon differs -- smallness -- from the thing of the diameter of balloon huge -- one by one -- size -- it exchanging for the thing of the diameter of balloon huge, inserting into a blood vessel, and, When the therapy by a balloon is performed and it carries out angiography with a catheter, at least three kinds of catheters, such as a left-coronary-artery catheter and a right-coronary-artery catheter pigtail catheter, are exchanged one by one, it inserts into a patient's blood vessel, and angiography is performed.

[0004] As mentioned above, if the blood vessel interpolation ON and drawing of a guidewire are repeated for every exchange insertion of two or more of the balloon catheters, a patient's burden will increase, and. Since long time-ization of an increase and therapy of therapy trouble is brought about and the danger of the vascular injury based on the repetitive insertion drawer of a guidewire moreover increases, In-series connection of the guidewire for extension is carried out at the end projected to the outside of the body of the guidewire which carried out the insertion set to the intravascular prescribed

position, The guidewire which carried out blood vessel interpolation ON first without having made the wire of the external extending part huge and exchanging guidewires is used, The system which carries out exchange insertion of two or more catheters one by one is adopted, and there is a well-known example shown in each gazette of JP,7-10280,B, No. 87858, JP,2-4390,A, and JP,5-92044,A as a connection structure of the guidewire for extension used for this system.

[0005]Namely, the publicly known joining structure into the slot 12 of the shape of a deep hole of the end 3 (portion projected to the outside of the body in a blood vessel interpolation ON state) of (refer to drawing 3) and the main guidewire 1 (the original guidewire inserted into a blood vessel is called main guidewire 1). The connector bar 13 projected at the end of the guidewire 2 for extension is inserted, Consist the main guidewire 1 and the guidewire 2 for extension of basic structure connected with series shape, and as a measure against a slip off stop of the connecting state, (Refer to (A) of drawing 3) Form the crimp part 14 which carried out plastic deformation of the insertion connection part to the trapezoidal shape which bulges in the diameter direction of a guidewire, or, (Refer to (B) of drawing 3) The locking claw mechanism in which the locking claw 15 within the slot 12 is made to engage with the locking groove 16 of the connector bar 13, Or the lock projection 17 within the slot 12 is made to weld by pressure to the connector bar 13, or the pressure welding machine style which makes the slot 12 with the slit 18 weld by pressure to the connector bar 13 is provided, and separation of the connected main guidewire 1 and the guidewire 2 for extension in use is prevented.

[0006]The connector bar (refer to (C) of drawing 3) is made into the meandering connector bar 13A "windingly" made into a longitudinal direction, The thing of the meandering bar structure which carries out impossible ON ***** and carries out a slip off stop to the slot 12 with the stop power by the impossible ON **, The annular lock projection 17 is made to weld by pressure to the periphery of the connector bar 13 which protruded on the inner circumference of the slot 12 and inserted in the slot 12 the annular lock projection 17 which dented annularly a part of **** of the shell of the slot 12, and carried out plastic deformation, and there is a thing of annular lock projection structure which stops the connecting state.

[0007]

[Problem(s) to be Solved by the Invention]The thing of said crimp structure of the conventional guidewire which consists of the above joining structure, Since the connecting lock of the main guidewire 1 and the guidewire 2 for extension is carried out strongly mechanically, Resistance when guiding and carrying out blood vessel interpolation ON of the catheter, and resistance which samples a catheter from a blood vessel (when extracting a catheter from a blood vessel) By blood coagulation etc., size considerably although the becoming resistance bears for being and a good connecting state can be maintained, plastic working of the crimp part 14 in the therapy spot, Since it is made very complicated and trouble is required, a catheter insertion - Extracts, and the crimp part 14 which bulged is moreover resisting and the crimp part 14 checks the flexibility of a guidewire, the clearing work nature of a catheter is bad and lacks in practicality. And repeated use at the time of catheter exchange of the guidewire 2 for extension is made impossible with shaping of the crimp part 14, and there is a difficulty of bringing about the high cost of a therapy.

[0008]And the thing of the aforementioned locking claw mechanism and a pressure

welding machine style, For example, since the locking groove 16 locking claw 15 is formed in the about 0.2-millimeter connector-bar 13 grade which made thin extra fine wires, such as a 0.35-millimeter diameter, The locking claw 15 grade serves as micro size extremely, and the stop power of being equal to the aforementioned catheter implantation and the resistance to extract cannot be expected, A possibility of connection of the main guidewire 1 and the guidewire 2 for extension separating, and losing the extended function of a guidewire during the clearing work of a catheter is strong, moreover, formation of the locking claw 15 grade of said micro size is substantially made difficult, and practicality does not exist.

[0009]On the other hand, since what carried out plastic deformation of the extra fine wire about 0.25 millimeter in diameter, for example to meandering shape is used for the thing of the meandering connector bar 13A, since the meandering connector bar 13A in which rigidity is inferior to the shell will change into a growth direct state easily and it will be adapted to the shape of the slot 12, if it inserts in the slot 12 of a straight shell, while connection stop power is inferior -- the meandering shape -- setting -- easy -- the intermittent periodic duty of the guidewire 2 for extension becomes difficult. Since the thing of said annular lock projection structure serves as a point contact stop to the connector bar 13 of the annular lock projection 17, Similarly stop power is inferior, and in a super-thin pipe about 0.3 millimeter in diameter, the processing itself formed as design shape makes difficult the annular lock projection 17 of micro size, and with "shape dispersion" on processing of the annular lock projection 17 which cannot be avoided. A possibility that a thing impossible [a connection stop] and deficient may occur at remarkable high rate exists clearly.

[0010]This invention provides the joining structure of the medical-application guidewire which cancels the difficulty of the above conventional technology.

[0011]

[Means for Solving the Problem]"Joining structure of a medical-application guidewire of this invention which solves the above technical technical problem In a medical-application guidewire which carries out connection connection of the connecting part of the front end of a guidewire for extension at series shape at a connecting part of a end face of the main guidewire inserted into a blood vessel, Form one side of said connecting part in a female connecting part of a meandered-pipes object in which a waveform continues in the direction of a tube length, and. Another side of said connecting part is formed in said female connecting part at a male connection part of a straight bar object which carries out insertion connection, and it has structure which maintains said meandering shape and in which a joined part of said female and male connection part carries out wide area contact" in said connecting state.

[0012]Namely, joining structure of this invention forms in meandered pipes a female connecting part of a shell which bends from the male connection part and excels [composition] in a relative target in mechanical joining structure which consists of a female connecting part of a shell, and a male connection part of bar shape which carries out insertion connection at the female connecting part, and it. It constitutes making it required and generating sufficient fitting locking power as technical thought by constituting a male connection part in straight bar shape, carrying out elastic deformation of both of an insertion connecting state mutually based on the meandering shape, and carrying out wide area contact, and maintaining the meandering shape. And make a shell

tip end part of the female connecting part into a tapered tube-shaped expanding part, or similarly carry out heating annealing only of the tip end part, it is made to soften, and a mode which eases stress concentration by bending of a guidewire in use to a bar base of a male connection part of an insertion connecting state is adopted.

[0013]

[Function]The joining structure of the guidewire of this invention of the above composition, Even if it sets up the ring formation thickness of a female connecting part quite thinly, in the size field of the medical-application guidewire used. From the flexural rigidity of the male connection part of a straight bar object, since the flexural rigidity of the female connecting part of a shell is excellent, If a male connection part is inserted in the female connecting part, a male connection part will adapt itself to the meandering shape of a female connecting part easily, and will carry out elastic deformation to it, and. Both plane of composition carries out wide area contact, a female connecting part also carries out elastic deformation of the meandering shape a little by the insertion resistance, a suppression fit is carried out, and the basic shape of the meandering shape is maintained and required and sufficient connection stop power as an intermediate connection part of a medical-application guidewire is obtained. And since the meandering shape leading to the stop power exists in a shell, there is little fear of setting modification and it is good. [of shape maintenance nature]

[0014]If connection and dissociation can be performed by pinching the above joining structure by a fingertip and strengthening a total and a connecting state is dissociated, elastic restoration of a female and the male connection part is carried out, it is restored to the original form, moreover, there will be very little wear by the total, and the number of times of considerable of the intermittent periodic duty of a guidewire will become possible. And meandering shape processing of the female connecting part of a shell should just be based on curving processing of the shell which has generally spread, special joint jigs are made unnecessary, and there is no difficulty on formation processing of a female and a male connection part.

[0015]

[Embodiment of the Invention]Joining structure of the medical-application guidewire of this invention is carried out as follows.

[0016]

[Example]Hereafter, it explains with reference to drawing 1 in which the joining structure of this invention 1 example is shown. Namely, in the joining structure of the guidewire 2 for extension of the extra fine wire made from stainless steel connected with the main guidewire 1, its main guidewire 1, and series shape of the extra fine wire made from stainless steel inserted into a blood vessel, The female connecting part 5 which consists of a metal thin shell is formed in the end face 3 of the guidewire 2 for extension, and this female connecting part 5 has become a meandered-pipes object "it winds in [an object]" to the longitudinal direction of a shell. And by forming the tip end part of the main guidewire 1 in the straight bar-shaped male connection part 6, and inserting and inserting the male connection part 6 of the main guidewire 1 in the centrum of the female connecting part 5 of the guidewire 2 for extension, The main guidewire 1 and the guidewire 2 for extension are connected enabling free attachment and detachment.

[0017]The female connecting part 5 is used as merit's thin-wall-tube object in detail a little which consists of a product made from stainless steel, or products made from an

alloy (titanium nickel alloy etc.), By arbitrary means, such as a "caulking" or "low attachment", a rear end portion adheres, and on the axial center 10 of the guidewire 2 for extension, a centrum is elongated and it protrudes on the base 3 which reduced the diameter of the guidewire 2 for extension. And it is formed in the meandered pipes which this female connecting part 5 follows an elongation direction in the waveform 4, and the whole shell makes loose "windingly", and the some portion at the tip has become the straight part 8 for making the male connection part 6 easy to insert.

[0018]And the male connection part 6 of the main guidewire 1 which carries out insertion connection at this connecting part 5, It protrudes on one in the shape of a straight bar via the taper part 7 which ***** (ed) the guidewire 2 for extension, and in order to make insertion to the female connecting part 5 easy to carry out, a tip is made to point round shape, and it has loose taper taper shape.

[0019]"The thing of the drawing 1 example The female suspending portion 5 Overall-length $L1=30$ millimeter, a tube inner diameter $D2=0.23$ -millimeter diameter, It is $H=0.12$ millimeter in a tube outer diameter $D1=0.34$ -millimeter diameter and height of the waveform 4, and $P=5$ millimeters in pitch of the waveform 4", and they are size specifications of "the male connection parts 6 are overall-length $L2=17$ millimeter and the diameter $D3=0.22$ millimeter of a base part", and "the wire size of the main guidewire 1 and the guidewire 2 for extension being a 0.35-millimeter diameter."

[0020]The joining structure of the above drawing 1 example has the aforementioned operation. That is, the flexural rigidity of the female connecting part 5 in the aforementioned size specifications becomes considerable size from the flexural rigidity of the male connection part 6 (the flexural rigidity which the female connecting part 5 of the geometric moment of inertia of the female connecting part 5 in the aforementioned size specifications and the male connection part 6 is remarkably larger, and becomes relatively from the male connection part 6 in size exists). Therefore, when insertion connection is carried out, the male connection part 6 to the female connecting part 5 the male connection part (refer to (B) of drawing 1) 6, Get used and carry out elastic deformation to the meandering shape of the female connecting part 5 which is excellent in rigidity, and it carries out "windingly", and the female connecting part 5 which accepts it also loosens meandering shape a little, and maintains a meandering basic shape, and, as for both, a slip off stop stop is mechanically carried out by the insertion resistance of the male connection part 6 good. And since it exists in the female connecting part 5 of a shell, the meandering shape leading to the stop power generating has good morphological stability, and by bending by use of a guidewire, etc., there are few possibilities of carrying out "setting modification", and it can carry out stable continuation of the aforementioned stop performance.

[0021]And this slip off stop stop power turns into stop power of the optimal usability which is a grade which can perform connection dissociation easily by [which is a grade from which that connection stop does not separate depending on the usual external force received at the time of use of a medical-application guidewire] being required and enough and pulling away strength by a fingertip. And, as for it, since the joining structure of the drawing 1 example makes the shell side meandering shape, it tends to carry out the meandering processing, and there is little working shape dispersion, and the aforementioned stop performance is stabilized, and. Since the connecting state is the aforementioned wide area elastic contact, repeatedly [of connection / connection

dissociation], there is little wear of a plane of composition, and the repeated use performance of a guidewire is stabilized as for it.

[0022]In order to prevent the male suspending portion 6 from stress concentrating on the base of the male suspending portion 6 where the tip of the female connecting part 5 contacts by wire bending in use in the aforementioned connecting state, and carrying out OFF disadvantage [of the joining structure of this invention], The mode which softens only a tip end part is adopted if needed, having formed in the tip expanding part 9 which expands the diameter of the tip part of the female connecting part 5 in the diameter of gradual increase like the drawing 2 illustration, making the taper part 7 of the male connection part 6 fit, or carrying out heating annealing only of the tip part of the female connecting part 5, and maintaining the meandering shape of a body part. And the female connecting part 5 may be formed in the main guidewire 1, and the male connection part 6 may be formed in the guidewire 2 for extension. As for the aforementioned annealing temperature, 220 ** - 255 ** are preferred, and, according to this temperature, the criticality effect comes out of the thing of the aforementioned titanium nickel alloy. And as for the thing made from stainless steel, about 800 ** - 900 ** are preferred.

[0023]

[Effect of the Invention]As the above explanation, the joining structure of the medical-application guidewire of this invention, It is made what cancels the difficulty of conventional technology and does the aforementioned characteristic operation so, and is conventionally constituted by the thing of structure, and the thought of another **, and the generic concept structure which insertion-arrival-connects the main guidewire and the guidewire for extension mutually provides a useful subordinate concept invention in a publicly known basis.

[0024]And have the outstanding connection performance, and excel in the operativity of connection / connection dissociation, and. Absence is used, stable maintenance of the extended connection function of the guidewire for catheter exchange use is carried out good, improvement in stable of the therapy nature of the therapy concerned is aimed at, and further, the harmful bulged part of a connection part improves the intermittent periodic duty nature of a guidewire, and promotes reduction of therapeutic cost. There are the above several effects.